

CLAIMS:

1-25. (Cancelled)

26. (Currently Amended) A reactor for electrochemically processing a microelectronic workpiece comprising:

one or more walls defining a processing space for containing a processing fluid, the one or more walls forming a processing cup having an open top;

a microelectronic workpiece support including one or more conductive members disposed to electrically contact ~~[the]~~ a microelectronic workpiece supported by the support, to provide electrical power for electrochemical processing of the microelectronic workpiece, the microelectronic workpiece support being disposed proximate the open top of the processing cup to bring at least one portion of the microelectronic workpiece into contact with the processing fluid for electrochemical processing;

an electrode housing disposed in the processing cup and having an open end facing ~~end that opens toward~~ the microelectronic workpiece support, ~~the electrode housing having an interior region configured to receive~~

at least one electrode adjacent to a lower end of an interior space the electrode housing;

a pressure drop member disposed over the open end of the electrode housing[:]
between the processing space and the interior space of the electrode housing;

a processing fluid flow path in the reactor, providing processing fluid into the electrode housing from a position vertically above the at least one electrode, such that processing fluid entering the electrode housing does not directly impinge on the at least one electrode in the electrode housing; and

~~a first fluid inlet, a first fluid outlet in fluid communication with the interior region, and a fluid tube coupled to the first fluid outlet, wherein the fluid tube contains~~

~~fluid from the first fluid outlet to the interior region to outside of the reactor;~~
and

a second fluid inlet and a second fluid outlet in fluid communication with the processing space ~~exterior to the interior region, wherein fluid from the process space exits the reactor via the second fluid outlet separately from the fluid tube.~~

27-30. (Cancelled)

31. (Original) A reactor as claimed in claim 26 wherein the pressure drop member comprises a permeable membrane.

32. (Original) A reactor as claimed in claim 31 wherein, the permeable membrane is conical in shape having an apex directed toward the interior region of the electrode housing.

33. (Original) A reactor as claimed in claim 26 wherein the pressure drop member is conical in shape having an apex directed toward the interior region of the electrode housing.

34-48. (Cancelled)

49. (Currently Amended) An apparatus for use in electrochemical processing of a microelectronic workpiece comprising:

a reactor having a processing space containing processing fluid;

an electrode assembly disposed in the processing space and comprising:

an electrode housing having an open end;

a pressure drop member disposed over the open end of the electrode housing, the electrode housing and pressure drop member defining an

electrode chamber with an interior region, the pressure drop member comprising a generally conically-shaped continuous material having no through openings;

an electrode disposed in the interior region of the electrode chamber;

a first fluid inlet, a first fluid outlet in fluid communication with the interior region, and a fluid tube coupled to the first fluid outlet, wherein the fluid tube contains fluid from the first fluid outlet to the interior region to outside of the reactor; and

a second fluid inlet and a second fluid outlet in fluid communication with the processing space exterior to the interior region, wherein fluid from the process space exits the reactor via the second fluid outlet separately from the fluid tube.

50. (Original) An apparatus as claimed in claim 49 wherein the pressure drop member comprises a permeable membrane.

51. (Original) An apparatus as claimed in claim 50 and further comprising a membrane frame disposed over the open end of the electrode housing, the permeable membrane being connected to the membrane frame.

52. (Original) An apparatus as claimed in claim 49 wherein the pressure drop member has a conical shape with an apex directed toward the interior electrode chamber.

53. (Cancelled)

54. (Cancelled)

55. (Previously Presented) The reactor of claim 91 wherein the membrane has a generally conical shape, with an edge region of the membrane disposed closer than a central region of the membrane to the workpiece support.

56. (Previously Presented) The reactor of claim 91 further comprising a flow distribution element having a multitude of openings through which at least one of the processing fluids can flow.

57. (Previously Presented) The reactor of claim 91 further comprising a shield positioned between the first and second electrodes, the shield having a rim and an opening disposed annularly inwardly from the rim.

58. (Previously Presented) The reactor of claim 57 wherein the shield is part of a field shaping element.

59. (Previously Presented) The reactor of claim 91, further comprising the microelectronic workpiece.

60. (Previously Presented) The reactor of claim 91, further comprising the first and second processing fluids.

61-92. (Cancelled)

93. (New) Apparatus for electroplating a microelectronic workpiece, comprising:
a fluid vessel;
an anode in an anode housing in the fluid vessel;
a pressure drop element in the vessel separating a first fluid flow region in the electrode housing from and a second fluid flow region in the fluid vessel above the pressure drop element;

a fluid inlet in the fluid vessel to provide processing fluid into both the first and second fluid flow regions; and
with substantially all processing fluid movement between the first and second fluid flow regions passing through the pressure drop element;
and
a cathode positioned to contact the microelectronic workpiece while the cathode and the microelectronic workpiece are in contact with the second fluid flow.